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Volume XI MARCH 1959 Number 2

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Richard M. Highsmith, Jr.
J. Granville Jensen
Oregon State College

For economic geography and world resources.

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I am especially impressed by the authors' clever use of maps, photographs, and diagrams . . . resulting in a more complete understanding of the nature of economic geography.

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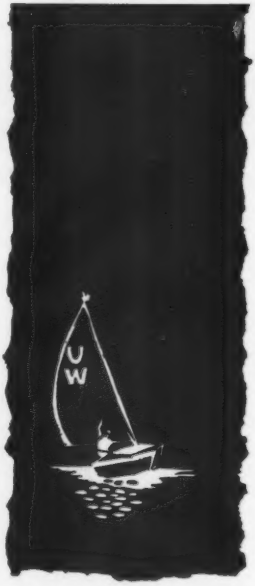

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The Association also publishes The Annals of the Association of American Geographers, which contains professional papers, presidential addresses, and abstracts of papers delivered at annual meetings.

UTILIZATION OF AIR PHOTOGRAPHS IN BRITISH DEPARTMENTS OF GEOGRAPHY

Alan D. Walton
University College of North Staffordshire

In the fall of 1957 a questionnaire was sent to twenty nine departments of geography in British universities. Twenty five responded. The survey was sponsored by S. H. Beaver, and organized by him and the author with the support of the Heads of Departments of the Institute of British Geographers.

The aim of the survey was to determine as accurately as possible the present standing of air photography in the teaching of and research in geography in the United Kingdom so that a firm basis might be established for pressing the urgent necessity for the establishment of a National Air-photo Library, as promised and expected since 1946, and the setting up of a system of easier access to national, commonwealth and world photographic coverage held in the Royal Air Force archives, at prices within the reach of universities and university personnel.

In this respect the project was in some ways highly effective although the proposals arising from it were abortive since the whole organization for the supply of air photographs from existing negatives held by the Royal Air Force to the public has been and is still undergoing review at high departmental levels wherein the universities have representation. This process began at the same time as the results of the questionnaire were circulated and in some measure cut the ground from beneath our proposals.

Although private air-survey companies operate from and within the United Kingdom and have large holdings of negatives, it is invariably felt in the universities that their prices are far beyond the reach of departments even though the companies operate at standard commercial rates and are competitive in world markets. The bulk of the prints held and purchased in this country are from existing Royal Air Force negatives which may be supplied for Personal Research Only at one shilling per print (about 20 to 25 cents when adjusted to domestic purchasing values), but for all other usages they are supplied at normal commercial rates. For standard 9" by 6" prints this is four shillings per print with increasing percentage discounts for quantity purchases. Thus the costs of purchase of teaching sets becomes prohibitive from both commercial and Service sources.

Within the collection under Royal Air Force control are the National Surveys of the United Kingdom which comprise a complete, post-war coverage at 1:20,000 scale, urban area coverages at 1:5,000 scale and a half-completed, recent, countrywide coverage at 1:20,000 scale. The wartime collection of about 8,000,000 negatives of overseas localities is still

extant but it has never been made readily available. Its fate is the subject of current discussion. There is also a considerable mass of post-war mapping quality coverage flown by Royal Air Force squadrons for the Directorate of Colonial Surveys.

Security regulations and diplomatic considerations have kept the coverage from the European Theatre of Operations of World War II virtually sterilized for the past thirteen years, and the former have also restricted the issuance of domestic coverage of, for example, industrial areas and ports. This is considered to be detrimental to the wider use of air photographs in geographical studies.

The system of ordering and supplying prints is not well suited to academic requirements since prints have to be ordered unseen and delays are common and unpredictable because civilian orders have the lowest priority in what is essentially a section of the Armed Forces of the Crown. All orders have to be made through the Air Ministry for both sortie plots and prints. There is a time lag of five or six weeks between ordering the sortie plot and its provision, and then a similar interval intervenes before prints which have been ordered arrive from the laboratories of Technical Training Command which have recently been moved to and centralized at Brampton Park, Huntingdonshire. Obviously great foresight is necessary if prints ordered for a particular field task are to arrive in time to be useful. A minimum of three and perhaps four or five months must be allowed.

Air-photo libraries exist at the Ordnance Survey Offices at Chessington, Surrey and in Belfast for Northern Ireland. Similar collections for Scotland are to be found in the Department of Health in Edinburgh. The Ministry of Housing and Local Government in London has a good library of prints, and local planning offices in the county towns and local administrative centers have local collections. The inspection of prints in these collections can sometimes be arranged personally before submitting an order for prints to Air Ministry but obviously prints cannot be removed from collections and the number of people admitted must be restricted. Although individual officers in charge of collections are most helpful, it would be highly advantageous if a clear statement of official policy were to be made and for recognized libraries to be more obviously accessible.

The Directorate of Colonial Surveys at Tolworth, Surrey, is prepared to make its mapping coverage available for inspection by bona fide personnel if appointments are made and precise areas of interest indicated in advance. Orders can then be placed directly with the negative holding agencies.

With the exception of the special cases of "national" coverage being amassed in the University of Wales at Aberystwyth by Emrys Bowen and the collection of the University of Edinburgh under the direction of J. Wreford Watson, collections of air photographs held by individual universities are small in numbers and limited in areal and topical ranges. Costs have been a severely restrictive element, and so have the security regulations which became more intense after 1950 and the breakdown of contacts between the universities and the Government and Service departments in post-war years.

Very little overseas coverage is held in college and university collections, and holdings of United Kingdom coverage are seriously limited in scope and patchy in extent. It is a sobering reflection that the total coverage reported in the whole survey amounts to only two thirds to three quarters of the coverage held by one Middle West U. S. university department of geography.

In most departments it was stated that the greater part of the staff use air photos on appropriate occasions in the context of illustrative material in lecture courses and reading recommendations. In a general way British geographers seem to be "air-photo minded." When answers to more detailed questions were analyzed, the expected deficiencies were strongly realized. Most departments introduce air photos to a very limited and most rudimentary extent in their course work, in "Map Interpretation," "Map Work" or "Elements of Cartography and Surveying" which are taught usually in Freshman year. Such work must necessarily be cursory and not "air photo interpretation" in any sense of the words.

In the full sense of air photo interpretation, six departments expressed intentions of offering such a course in the near future or of reviving defunct courses previously offered, but only four departments, (London School of Economics, University College of North Staffordshire, Queen's University, Belfast, and King's College, Newcastle), are currently teaching a full, independent course in the "Elements of Air-photo Interpretation." Of these, two are run outside the normal syllabus of the department of geography on a voluntary basis "for as many as will." Under these conditions, the hours of work put into laboratory sessions and reading are exceedingly limited and funds for new coverage and equipment are not readily available.

In nine departments some photogrammetry is taught internally, in advanced course work usually in the final (third undergraduate) year of the "Honours" school, to the few students who specialize in "Cartography and Surveying." In the University of Bristol such work is more widely undertaken than is usual at the undergraduate level. In eight further departments (which include four Colleges of the University of London who participate in an inter-collegiate system of special optional courses in final year) there is effective liaison with departments of Civil Engineering, Geology, Archaeology or Surveying for similar instruction.

No one claimed to have completed an academic course of training in air photo interpretation in any of the field sciences. The lack of courses offered precludes this and indeed suggestions were made that such a course for potential instructors might be welcomed as a summer session project. Twenty eight members of teaching staffs claimed to have had some experience in war-time, military interpretation, but since many more than these claimed to be using air photographs in most branches of geographical research considerable crude experience may have been gained by "faith and blind hope" in the use of air photographs.

In photogrammetry, formal courses had commonly been taken by the dozen persons involved and this was bolstered by occasional claims to formal courses taken at the International Centre at Delft, in the National

Institute of Geography in Paris, with the Directorate of Colonial Surveys and in the surveying branches of the Royal Engineers.

Library facilities varied very widely from extremely poor to excellent. The better collections in university libraries covered all the more familiar texts and standard works of European and American origins. It is most gratifying to see a wide distribution (15) of the 1952 edition of the American Society of Photogrammetry's Manual of Photogrammetry. One library only, that of King's College, Newcastle, has a copy of the edition of 1944. Photogrammetric Engineering is available in 13 libraries or periodical rooms. The British journal, The Photogrammetric Record is mainly concerned with technical and photogrammetric topics and contains little of consequence to those interested in air photo interpretation. It is available in eight university libraries.

The general standard of equipment for air photo interpretation is fair with respect to hand stereoscopes. About half of the reporters claimed access to mirror (bench) stereoscopes and parallax bars for simple photogrammetry. Four departments only possess scales calibrated in thousandths of a foot. A few attempts measurements with scales calibrated in more conventional but much more cumbersome divisions. Broadly speaking, for small items of equipment the situation in the United Kingdom compares not unfavorably with that in the United States.

Only ten departments have access to advanced, complicated, expensive photogrammetric machinery, and of these only six have access to really first class equipment which is usually lodged in other departments of their university. Here the transatlantic comparison is decidedly unfavorable to the British departments.

The conclusion one is compelled to draw from the results of the questionnaire is that generally, although British geographers are aware of the value of the use of air photographs in geographical studies, little has been done, to date, to establish the use of this tool in both teaching and research. Deficiencies are too obvious in all aspects of the case and it would seem that the time is ripe for the organization of a serious attempt to remedy them, the beginnings of which are now becoming reality.

RADIOCARBON DATING

Robert H. Fuson
Louisiana State University of New Orleans

Because geography is still largely a science of synthesis, its practitioners continue to rely on the findings of other disciplines. Sometimes this reliance takes on the aspects of "blind faith," especially when the geographer is confronted with the necessity of using information from the fields of physics, chemistry, or advanced mathematics. In such cases, most geographers find themselves too poorly versed in these fields to question the methods employed to produce the information. Method, however, is not the significant factor. What is important is the degree of re-

liability and precision. Geographers must take cognizance of this distinction because a perfectly valid method possesses varying degrees of worthiness, depending upon circumstances surrounding the techniques of application. This difference between the integrity of the method and that of the information produced by its application is well illustrated in the case of radiocarbon dating, which as an age-determining method is exerting a powerful influence on all historical sciences.

It is not my purpose to question the validity of radiocarbon dating as a technique for assigning a specific date to an object. To do so would be to dispute the established theories of nuclear physics. This is not to say that there are no limitations to the method, for there are many. Unfortunately, these limitations frequently are disregarded. Further, there have been cases where radiocarbon dating has taken on all the aspects of a panacea, and as such has done more to hinder penetrating research than to encourage it. Geographers, all-too-often willing to fall back on the basic research of others, have begun to accept certain assigned dates as being conclusive. Some people would even disavow established geological principles when these appear to contradict specific dates determined by radiocarbon analysis. It should be remembered that although the method of radiocarbon dating approaches infallibility, human application, interpretation, and evaluation may introduce serious amounts of unreliability.

Radiocarbon (C^{14}) methods began at the University of Chicago in 1931, and the first age measurements were published in 1951. Many excellent articles are now extant dealing with the radiocarbon method of age determination. Essentially the method is this. There are three naturally occurring isotopes of the element carbon; C^{12}, C^{13}, and C^{14}. Each of these carbon isotopes has six protons in its nucleus, but the neutron count is six, seven, and eight, respectively. Whereas C^{12} and C^{13} are stable isotopes, C^{14} is not. Instability in the C^{14} isotope results in the ejection of an electron from the nucleus. This converts one of the excess neutrons into a proton, giving the atom seven protons and seven neutrons. Such an arrangement is no longer a carbon atom but a nitrogen atom.

Radiocarbon dating stems from the fact that the rate of this conversion from C^{14} to N^{14}, or atomic disintegration, is known and measurable. In the isotope C^{14} only half of a known number of C^{14} atoms remain after 5568 ± 30 years, the other half having been converted to nitrogen atoms. After approximately 11,136 years one fourth of the original atoms are present, and the number of C^{14} atoms will be halved every 5568 ± 30 years. This rate of radioactive decay never varies.

Carbon 14 has its source in the upper atmosphere, where cosmic radiation produces the neutrons that enter the abundant N^{14} nuclei. With each such collision a proton is knocked from the nitrogen atom, converting it to C^{14}. These carbon atoms unite with oxygen in the air to form carbon dioxide, in the same way as do the isotopes C^{12} and C^{13}. Radiocarbon is thereby circulated in CO^2 through every living plant and animal as a constant, though different, percentage for different organisms. When the organism is removed from the CO^2 cycle (at death) the atomic decay begins. Thus, if the C^{14} concentration in the carbon from an oyster of

unknown age were measured and found to be one fourth that in a living oyster, the age of the shellfish would be approximately 11,136 years.

Radiocarbon age determination can be of inestimable value to the geographer if he probes deep and follows his own lines of independent research. Interpretation of the C^{14} dates furnished by the laboratory requires geographic skill if they are to possess geographic significance.

Though C^{14} dating should become a primary technique for geographic research, the geographer must continue to recognize and respect the other age-determining techniques. Basically, these include: astronomical methods, botanical methods, chemical methods, geographical methods, geological methods, geophysical methods, pedological methods, radio-activity measurements (other than C^{14}), rates of accumulation of natural and cultural deposits, and historical records. To be sure, some of these techniques require further elucidation before their worth can be proven. Similarly, certain circumstances preclude the use of one or more of these methods. Other than preserved historical records, C^{14} seems to be the easiest way to obtain a date, and for this reason may well prove to be the one technique handled most indiscriminately. The investigator simply sends his carbon to a laboratory and eventually receives the date in the mail. Though costly, it is probably less so than most of the other methods listed, since these latter require tedious, time-consuming field research.

Geographers have long been concerned with dating physical and cultural features, and C^{14} suddenly reduces a complex problem to one of dramatic simplicity. Nevertheless, it is imperative that we do not sweep aside all other dating methods. The challenge of radiocarbon age determination may be best met by carefully executed field and laboratory research, and by cross-checking C^{14} dates. Properly employed, C^{14} dating will reveal hitherto unknown facts about our landscapes, but the geographer should exercise discrimination and caution in using the radiocarbon age-determining technique.

DESIGN PROBLEMS IN AERONAUTICAL CHARTING

John E. Dornbach
USAF Aeronautical Chart & Information Center

Increasing speed and other advancements in aircraft operations place new demands on the aeronautical chart cartographer to provide the pilot or navigator with an efficient and functional tool. These demands raise a host of design problems which can be solved only through an evaluation of the aeronautical chart in terms of the user. It is not enough simply to study the chart itself for its pleasing appearance and adherence to general cartographic standards. The research of Willis Heath and John Sherman on making maps for the blind has proved unquestionably that the beauty and quality of these maps come in their functioning for their intended purpose and not in how nice they feel to the tactile percepts of the blind.

If the average graphic is to be of value for its intended purpose, it

must be so designed that the user can act accurately, decisively, selectively, and quickly. This indicates that design and use of color are of extreme importance, i.e., the psychological aspects of information transmission are of much greater importance to the design phase of cartography, than the physical and physiological aspects of human vision. This, of course, emphasizes that the process of perceiving, interpreting, judging, estimating, and learning is of a much higher order than simply seeing. If this were not true the human eye would be just a camera sensitive to light energy, rather than a window through which visual perception stimuli are received.

It is well known that if the human eye-brain combination is fed the right kind of data, it can function with an extraordinary high degree of efficiency. When the visual input data are incomplete, erroneous, or poorly designed, this combination may become confused, unreliable, or may fail completely. Thus, for the purpose of analysis, the human eye-brain combination can be dealt with as a system that depends upon accurate data input for its proper operation. This means then that the map or chart is simply an information or data transmitter.

The problem of transmission of cartographic information through visual communication channels is of no greater importance for the pilot of a supersonic jet bomber using a chart at 40,000 feet, than it is for an elementary school student in a classroom meeting a wall map for the first time. Of course, there is a difference in sophistication, but if each graphic is specifically designed to fit the situation, it will do its intended job. It is apparent that something is amiss in the field of cartography when some of the same symbols, colors, techniques, and practices are used on both of these quite different graphics. It should be evident that empirical cartographic rules, concepts, and conventions born of the "general" or multi-purpose map before the conception of the airplane, may be of questionable value in designing a special purpose graphic such as the aeronautical chart. It is also evident that a classroom wall map is not simply a "general" map, but is a graphic required to transmit certain information to the individuals with whom it is to communicate.

If this concept of information transmission is carried one step further, map representation becomes more than just a maze of lines, dots, and colors. The assemblage becomes a complete visual display. If the user cannot readily extract the information he requires or is forced to perform complex mental integration before he can use the information presented, the design is inadequate. If the user is forced to learn, re-learn, or remember an abstract symbology before he can extract the information he needs, there are most probably deficiencies in design.

In recognizing graphic design of any chart produced for a specific purpose as a visual display problem in the man-chart system, the following hypothesis may be formulated: the value of the chart information as it is portrayed will be in direct relation to the user and his needs, in his specific circumstance; the clarity and legibility of the entire display will be in direct relation to the situation of viewing, the methods of portrayal, and the systems and techniques of reproduction.

Let us analyze this hypothesis in the light of a recent chart developed at ACIC and the design problems encountered. For years we have been producing a 1:5,000,000 scale chart series called the Aeronautical Planning or AP chart. These charts were designed to meet the general needs of planning long range flights and for general planning of theater operations. Emphasis on planning infers that the navigational use of this chart would be at a minimum. Characteristic of most aeronautical charts designed prior to the last few years, these charts carry relatively conventional hypsometric tints and colors. Symbols, type styles and sizes, and hydrographic portrayal all generally conform to established convention.

When the U. S. Air Force developed a capability for globe circling flight of long range jet and conventional transports, the high speed and high altitude of these operations created a need for a small scale navigational chart. At this time the only charts possibly suitable were the 1:2,000,000 Jet Navigation Chart (JN) and the 1:5,000,000 AP chart. The 1:2,000,000 scale was determined to be too large, and the design of the AP was considered deficient for navigational use. It was at this time that a requirement was firmly established for what was to become the Global Navigation and Planning Chart (GNC) series.

After a thorough analysis of all USAF uses for a 1:5,000,000 graphic of this type, a Requirement Guide was written, and development for a suitable series of aeronautical charts was requested to serve the following specific purposes: (1) high speed, long range navigation under conditions wherein pilotage navigation, that is visual recognition of ground checkpoints, would be of secondary importance; (2) preflight planning of long range missions; (3) planning of strategic and tactical air operations; and (4) logistical planning functions related to support of U. S. military forces overseas.

Requirement criteria were established for this chart based upon the major uses. These criteria called for design characteristics which would emphasize cultural and natural features in the following order of importance: (1) major relief features, (2) major hydrography, (3) cities of strategic or economic importance to a nation, and/or important termini of long range flights, (4) major transportation networks, (5) secondary cities or towns in isolated areas, (6) miscellaneous cultural features in isolated areas, and (7) secondary cities and towns in densely populated areas.

Using these design characteristic guidelines, a chart was developed that introduces a number of cartographic innovations. For example, major landforms are portrayed on the shaded relief plate. Hypsometric tints are not used. Instead, color is used to present general information concerning the relief characteristic of landform groups. Green indicates level to rolling topography, and buff, rolling to steep topography. At present we are experimenting with use of a second yellow or what might be termed a "cap" tint to accentuate the major mountain masses. The elevation depicted by this second yellow may vary from chart to chart. A photo-mechanical vignetting technique has been used for open-water areas to emphasize shorelines. This technique was a result of pilots preferring

space in open-water areas free of color in order to make notations, and the necessity for emphasizing the shoreline which is of distinct value in making approaches from water to land, especially at night.

In meeting design problems at ACIC emphasis has been placed on studying operational use considerations. This approach has also been pointed out in the more recent work of Arthur Robinson, Robert Williams, and others who believe that functional design for visual presentation of cartographic information is of major importance and is receiving too little attention from the cartographer. There is evidence, however, that present day cartographers are beginning to question the so-called standard methods of map portrayal and the use of what Arthur Robinson has termed "absurd rationalization or illogically founded convention."

ACIC efforts have demonstrated that the same principles will hold true whether the graphic is an aeronautical chart, a wall map for classroom use, a statistical presentation, or a map designed for a very special use, such as television instruction. For any graphic produced for a certain situation or for a particular viewer, the major problem in design is to determine principles, materials, and techniques that can best provide the user's eye-brain combination with the stimulation it needs to receive quickly and accurately the informational content.

It is somewhat inconceivable, therefore, that the fertile field of human perception has not been more thoroughly cultivated by cartographers in search of principles of design for the communication of information by graphic presentation. If use of color, symbol design, and other methods of portrayal can be substantially validated through psychological and physiological studies, then cartographic design may be lifted from the realm of subjective creative expression, and placed in the field of functional design where experimental evidence concerning the behaviour of man, the user of maps and charts, will support the display design applications of cartographers.

FURTHER COMMENTS ON GEOGRAPHICAL RESEARCH ON THE USSR

Jack R. Villmow
Ohio State University

Jackson's article in a recent issue of The Professional Geographer on "American Geographic Research on Russia" deserves special attention in all major departments of geography where the Geography of the Soviet Union is either being offered or under consideration for future offering.

Two points made by Jackson ought to be emphasized and enlarged upon: (1) geography is considered an "underdeveloped discipline" in Russian studies in part because young geographers have not been afforded access to programs in area studies. This seems to be an appropriate place to draw attention to one of what is hoped to be an increasing number of Soviet area programs in universities throughout the country. During the first

session of the summer quarter 1959, Ohio State University is offering, for the first time, a summer program on the Soviet Union. From June 22 through July 24, 1959, this university offers a program "intended for non-specialist-students, teachers, journalists, community leaders, and all others interested in public affairs - who wish to extend their knowledge and deepen their understanding of an area which is of vital importance to Americans today. There are, moreover, opportunities for those who desire professional training on either the introductory or advanced levels." Seven courses will be offered: Soviet Economic System, Soviet Literature in English Translation, Soviet Russia (History), The Soviet Union (an integrating pro-seminar), Geography of the Soviet Union, Regional Patterns in International Politics - The Soviet Union, and Interdepartmental Seminar on the Soviet Union. Further information about the program can be obtained from the Director, Professor Charles Morley, Department of History, Ohio State University.

(2) A second factor which Jackson underlines is the problem of providing the mature scholar with advanced research opportunities. There is little question that librarial research has and will continue to be more heavily depended upon than field research in the Soviet area.

An article by the Slavic Librarian at Columbia University in a recent issue of College and Research Libraries is relevant to this point: "Bibliographical Guides to Russian Periodical Publications, 1901-1956." These bibliographical guides contain most material published on a regular basis in the form of journals, newspapers, bulletins, etc.

The 18th and 19th centuries are best covered in the following three works: Russkaia periodicheskaia pechat, 1703-1950; Spisok russkikh povremennykh izdanii, 1703-1899; and Istoricheskoe rozyskanie o russkikh povr. izd. i sbornikakh za 1703-1802. The best coverage of pre-revolutionary 20th century is in Predvaritel' nyi spisok periodicheskikh izdanii Rossii 1901-1916 godov. The All-Union Book Chamber, governmental agency which is in charge of bibliographical activities in the Soviet Union, will shortly complete a ten-volume series: Periodicheskaia Pechat' SSSR, 1917-1949. The volumes include the following subjects: I - socio-political and socio-economic; II - natural science and mathematics; III - technical sciences and industry; IV - transportation, communication, and communal work; V - agriculture; VI - science, education, physical culture, and sport; VII - medicine; VIII - linguistics, literary criticism and art; IX - publishing, library science, bibliography; X - index.

Early in the 1950's the All-Union Book Chamber reorganized the registration of periodical publications and began publishing a complete list at five year intervals. The first of these comprehensive five year volumes, which covers journals and newspapers, and scholarly publications, transactions, and irregular periodical publications, is Letopis' periodicheskikh izdanii SSSR 1950-1954. For those with limited acquaintanceship with the Russian language, W. Gregory's List of the Serial Publications of Foreign Governments 1850-1931, edited by Winfred Gregory, New York, 1932, covers Russia on pages 658-716. All titles are given first in the Russian alphabet and then in English transliteration.

The best known list of periodical publications in English is Union List of Serials in Libraries of the U. S. and Canada, which includes holdings of a total of 600 libraries. Russian works are in alphabetical arrangement with others.

Finally, there is a union list published in Paris in 1956 by the Bibliotheque Nationale which lists Cyrillic Slavic Periodicals in French university libraries and the Parisian libraries as of 1950: Catalogue collectif des periodiques.

JET STREAMS IN THE ARCTIC

Henry J. Warman
Clark University

This statement was made by C. G. Rossby in 1947 - "The maximum wind zone aloft resembles a broad stream meandering eastward around the hemisphere in wavelike patterns. The kinetic energy of this stream is concentrated in a narrow band of high wind speed embedded in a relatively quiescent surrounding atmosphere." He said this after continuous reflection on the high velocity wind regions in the upper westerlies which were revealed in the 1933 studies by V. Bjerknes and the 1944 studies by H. C. Willett.

Subsequently, considerable research has been done, not in the high latitudes of the Arctic but mainly in the mid-latitudes along the polar front. Well documented papers reveal the character of the jet stream in these latter latitudes, particularly in its relation to temperature and to wind fields. Conjecture has increased about the possible existence of a jet stream farther north, that is, an Arctic jet stream. G. P. Cressman, in 1950 in an article "Variations in the Structure of the Upper Westerlies," stated that the jet stream (only one was known at that time) possessed a multiple structure and that separate jets tended to drift equatorward. He was supported by W. A. Baum in a report to the Office Naval Research, "Aspects of the jet Stream over North America in the Mean Monthly Pattern, July 1947-1948", and also in a paper presented at the Toronto Meteorological Conference 1953 by D. P. McIntyre and R. Lee entitled "Jet Streams in Middle and High Latitudes."

Each successive study seemed to give credence to the idea that there are probably three jet streams associated with three fronts: one, the polar jet; a second, the tropical jet; and a third, a high latitude (Arctic) stratospheric jet. William J. Campbell was sponsored by the Geophysics Research Directorate of the Air Force Research and Development Command to investigate this last so-called Arctic Jet Stream. His findings are as intriguing as his methods are ingenious.

Two meridians, the 80° West and the 20° East were chosen as his base lines. One can realize his scheme if he imagines these base lines, the meridians, as the long bases of huge transparent rectangles standing upright on their long sides. The bases were marked off with the parallels

of latitudes as units of measurement. Then the velocity of the wind was recorded as it hummed across the meridians at varying heights above the several latitude markings. All significant west wind maxima were tabulated, as to latitude and intensity, for each day of a two year period, November 1954 to October 1956. The intensities were measured geostrophically, which, expressed simply, means measurements were taken of winds not affected (slowed down) by friction with the earth's surface. Naturally these would be high off the earth's surface, well above 18,000 feet.

Along the 80° W. meridian averages revealed that a single jet stream was observed 13% of the time, a double jet 70%, a triple jet 17% and a quadruple jet less than 1%. The situation was markedly similar along the 20° E. meridian, with one jet 10% of the time, two jets 60%, three 30% and four less than 1%.

The next step in the research was to find the average monthly positions of the wind maxima at 80° W. and 20° E.; in other words, at what latitudes were the speeds the highest for most of the time. The average latitudes for two well marked wind maxima points turned out to be 39° and 69° North. At the latter high latitude a separate wind maximum is present about 90% of the time. This jet has a core at the 300 millibar pressure level far above the earth with a maximum wind component of 65 knots.

That there is an Arctic jet stream as well as a central mid-latitude jet stream seems to be well established. Continued research may bring into common knowledge a third one, the tropical jet stream. With this knowledge, broken down into exact locations, speeds, and time, we may hear people in the future say, "I intend to travel to Europe and plan to leave in November when the Arctic jet stream provides the smoothest and quickest ride." The response to this might be, "And be sure to return on the tropical jet -- you can whiz around the world as if on a magic carpet."

ASSOCIATION AFFAIRS

AAG Committees
August 1958 to April 1959

Executive Committee:
Lester E. Klimm, President; Chauncy D. Harris, Past President; Paul A. Siple, Vice President; Arch C. Gerlach, Secretary; Wallace W. Atwood, Jr., Treasurer; Henry M. Kendall and G. Etzel Pearcy, Councilors.

Elected Committees

Credentials Committee:
E. Willard Miller, Chairman; Richard S. Thoman and Clarence W. Olmstead

Honors Committee:
Raymond E. Murphy, Chairman; Shannon McCune and John K. Rose

Nominating Committee:
Thomas R. Smith, Chairman; John R. Borchert and Louis O. Quam

Appointed Committees

Cartography Committee:
Robert J. Voskuil, Chairman; James J. Flannery, Fred W. Foster, R. E. Harrison, George F. Jenks, Allen K. Philbrick

Finance Committee:
Warren J. Nystrom, Chairman; Leonard H. Dykes, Wallace W. Atwood, Jr. (ex officio)

Membership Committee:
Ross N. Pearson, Chairman; George F. Deasy, Lyle E. Gibson, Robert Klove, John W. Morris

Placement Committee:
Lois Olson, Chairman; Whipple Abbe, John D. Abrahamson, Betty Didcoct, Mrs. Gordon Hull, Harold Sweed, Joseph F. Winkler

Publications Committee:
Henry M. Kendall, Chairman; Ruth Baugh, Andrew H. Clark, Walter M. Kollmorgen, Evelyn L. Pruitt, William L. Thomas, Jr.

Regional Divisions Committee:
Paul A. Siple, Vice President, and Division Chairmen

Research Grants Committee:
Loyal Durand, Jr., Chairman; Charles B. Hitchcock, Donald Hudson

Bureau of Census Advisory Committee:
John Fraser Hart, Chairman; John W. Alexander, Loyal Durand, Jr., William Garrison, George Jenks, Harold Mayer, Raymond E. Murphy, Howard Nelson, Edward Ullman, Wilbur Zelinski

Constitution and By-Laws Committee (on stand-by basis):
John Kerr Rose, Chairman

Ad Hoc Committees

AAG Fellowships Committee:
Clyde Kohn (1959), Chairman; Herbert Gross (1960), Eugene Cotton Mather (1961)

Air Force ROTC Committee (on stand-by basis):
Jan O. M. Broek, Chairman; W. A. Douglas Jackson, Shannon McCune, Donald W. Meinig, Merle C. Prunty, Jr., John R. Randall, Benjamin Thomas

Committee on Climatology:
David Miller, Chairman; John R. Borchert, Reid A. Bryson, F. Kenneth Hare, Glenn Trewartha, Samuel Van Valkenburg

Committee on Mass Data Processing Techniques:
Howard G. Roepke, Chairman; Reid A. Bryson, Arnold Court, William L. Garrison, Robert C. Klove, William Warntz

Committee on Military Geography:
Thomas R. Smith, Chairman; Alfred Booth, Louis Peltier

Committee on Status and Trends of Geography in the United States:
Clarence F. Jones, Chairman; Albert Ballert, Wilma Fairchild, Howard L. Green, Preston James, G. Etzel Pearcy

Exchange of Publications Committee:
Nordis A. Felland, Chairman; Arthur L. Burt, John W. Coulter, Marie C. Goodman, Chauncy D. Harris

Geographers in Business Committee:
John W. Reith, Chairman; Stanley A. Arbingast, Albert Ballert, George O. Davis, Howard L. Green

Geographers in Government Service Committee:
Lloyd D. Black, Chairman; William Whipple Abbe, Richard N. Hall, John K. Kern, Margaret M. Kingman, Ruth Lee, Alvin A. Munn, G. Etzel Pearcy, Robert H. Randall, Jr.

International Fellowships Committee:
Donald Patton, Chairman; Walter W. Deshler

Program Committee (Pittsburgh 1959):
E. Willard Miller, Chairman; Wesley Calef, Lucile Carlson, Wilma Fairchild, Alfred Meyer, (J. Norman Carls)

Local Arrangements Committee (Pittsburgh 1959):
Norman Carls, Chairman; Donald Ballas, Erich Bordne, Carole Bradley, Henry Castner, Gerard Foster, Edward Hanten, James Jennings, Ralph Jackson, Leonard Kuntz, Mary Viola Phillips, Zoe Thralls

Program Committee (Dallas 1960):
Harry Hoy, Chairman; Edwin Foscue, Frank L. Keller, Fred B. Kniffen, Dan Stanislawski

Local Arrangements Committee (Dallas 1960):
Edwin J. Foscue, Chairman; John F. Bergmann, Virginia Bradley, Lee Knox

Field Trip Committee (Dallas 1960):
Stanley Arbingast, Chairman; J. Edwin Becht, Lorrin Kennamer, Robert M. Taylor

Editorial Boards

Annals: Harold H. McCarty, Guido G. Weigend, John E. Brush, Edwin H. Hammond, Leslie Hewes, Hibbard V. Kline, Jr., William Garrison, James J. Parsons

AAG Monograph Series: Gilbert F. White (1959), Stephen B. Jones (1960), Richard J. Russell (1961)

Delegates

National Research Council: Charles M. Davis
American Association for the Advancement of Science: Alfred Meyer (1959)
National Council for Geographic Education: Clyde Kohn
American Council of Learned Societies: Walter W. Ristow (1959)

REPORTS OF COMMITTEES

Credentials Committee

This Committee processed the applications of prospective members of the Association. The merits of each case were considered as to the type of membership to be recommended. Because a decision on each case had to be reached expediously, the committee carried on its work by correspondence with a line of routing and a special form for recording the decision of each committee member for each applicant.

The work of the committee was frequently handicapped by lack of adequate data, especially of dates and types of position, of the applicants professional experience as a geographer.

---E. Willard Miller, Chairman

Honors Committee

The report of the Honors Committee and subsequent action of the Council will be announced at the Annual Meeting.

Nominating Committee

The report of the Nominating Committee appeared in The Professional Geographer, January 1959.

Finance Committee

The Finance Committee held three meetings to review the financial status of the Association. Recommendations were made for the sale of certain stocks and bonds, and for the purchase of stocks. The objective has been to build a well-balanced portfolio of income and growth stocks.

The Finance Committee has worked closely with the Treasurer, Dr. Wallace W. Atwood, who will report in detail regarding the financial and investment status of the Association.

---J. Warren Nystrom, Chairman

Research Grants Committee

This year the Research Grants Committee has received the largest number of applications of the last several years. Some applications were

received prior to the notice in the November Professional Geographer; others were, no doubt, the result of the decision of the Council and the Committee to acquaint the membership with the availability of research grants from the AAG. Although always advertised at the meetings, many members were unaware, apparently, of the support given by the AAG in the form of research grants.

Applications are considered under two headings. One is physical geography, supported by funds of the Wallace W. Atwood bequest to the AAG, and restricted to this phase of geography. The other heading is "unrestricted" and is supported by AAG funds.

Because of the shortness of the AAG "year" currently, committee recommendations will be considered by the Council at the Pittsburgh meeting.

---Loyal Durand, Jr., Chairman

Fellowships Committee

The Fellowships Committee was appointed by the Council at its meeting in Santa Monica in August 1958. Since its appointment, the Committee has announced the A. J. Nystrom Memorial Fellowship for the academic year 1959-1960 and has received applications. The announcement of the recipient of the award will be made on or about March 15. The Committee is disturbed by the relatively small number of applications received, and hopes that in the future, as the fellowship becomes better known, a larger number of qualified applications will be received.

---Clyde F. Kohn, Chairman

Placement Committee

Since the August 1958 meeting of the Association of American Geographers the Placement Committee has initiated Jobs in Geography, a monthly listing of openings in the field of geography. The first 4 issues have been mailed to more than 350 members of the Association who have filed Placement Data Cards with the Committee. Distribution is growing steadily.

The activities of the Committee currently are directed toward a two-fold goal: (1) to build up JIG through fuller job coverage and make it a standard tool for job recruitment; and (2) to locate job opportunities outside the academic field, particularly for geographers with BA and MA degrees. Of the jobs that have been announced, the ratio of teaching to non-teaching (chiefly planning) jobs is 7 to 5. As the end of the college year approaches, the proportion of teaching positions will probably increase. In the past 8 months the Committee has written to the official planning agencies of all 49 states and to a selected list of 72 trade associations whose member organizations might be interested in employing geographers. Information concerning job possibilities is being requested from AAG members employed in business. The response from these sources has been encouraging, and the number of non-teaching openings announced in the first 4 issues of JIG is larger than the total number of similar requests handled by the Committee during the preceding 18 months.

A list of Federal Civil Service examinations for which some geographers might be eligible is a regular feature of JIG. To keep in touch with current job trends in government, one member of the Placement Committee now serves as its representative on the Committee on Geographers in Government.

In addition to the publication of JIG, the Placement Committee continues to maintain its file of individual data cards, which is both available to and used by potential employers. In its monthly meetings the Committee has considered various other proposals of possible interest to geographers as employees or employers. At present a major concern is an exchange between American geographers and their British counterparts.

Bureau of the Census Advisory Committee

This Committee has scheduled an open meeting at 8 P. M., Tuesday evening, 31 March, during the National Meetings in Pittsburgh, at which Dr. Conrad Taeuber, Assistant Director of the Bureau of the Census, will discuss its organization, budgetary outlook, and plans for the 1960 Censuses. Although the Committee is preparing a list of topics for discussion, its Chairman would welcome suggestions from any member of the Association. This meeting will provide an opportunity for all geographer-consumers of Census data to obtain authoritative answers to questions they may have concerning the 1960 Censuses.

The Committee recognizes the budgetary limitations of the Bureau of the Census, agrees that it is doing an excellent job with the money available, and understands that changes in one place may require deletions elsewhere. In our postal deliberations, however, we have concluded that certain changes are desirable; our recommendations and conclusions may be considered under four general headings.

Minor Civil Division data We emphasize the interest of geographers in maximum availability of MCD data, and, assuming that we cannot have both, we prefer more raw data to more graphics.

We suggest establishment of state or regional depositories of complete sets of MCD data for the state or region; these might be located in the libraries of land grant institutions (some of which have already acquired agricultural MCD data), where they would facilitate local research.

Maps We feel that preparation of special purpose maps is a task for individual scholar rather than the Bureau of the Census, although we recognize the importance of having special purpose maps available to the general public. We desire an increase in their quality, rather than in their quantity, however, and we are forming a sub-committee to make specific recommendations as to their content and character.

We recommend the preparation of a Census Atlas, or some similar publication, which would include the more significant maps and charts from all 1960 Censuses. Such an Atlas should form an integral part of the Census Monograph Series jointly sponsored by the Bureau and the Social Science Research Council.

We recommend that state outline maps be restricted to one or two standard scales, perhaps 1:500,000 and1:1,000,000. We also recommend consideration of the desirability of preparing a blue line county outline map of the United States at the National Atlas scale of 1:10,000,000.

Tabular presentation We strongly recommend that totals be included in those tables giving separate data for males and females.

We strongly recommend a more explicit statement in the introduction of each Census volume which will specifically and briefly explain changes in definitions, categories, and tables, as we feel that existing signposts to lack of comparability between successive Censuses are inadequate.

We are split on the value of SEA data, but a majority of us believe that it would be desirable to have fewer data for State Economic Areas and more for Minor Civil Divisions.

We make no recommendation on the replacement of "occupation group" data by "industry group" data, but some of us feel strongly that the latter are of far greater value and significance.

Long-range plans We believe that the Association should have a standing committee to make specific and timely recommendations for future Censuses (the present Committee was established after much of the planning for 1960 Censuses had already been completed). The present Committee hopes to investigate, stimulate research on, and make recommendations concerning the following topics: possible new questions or revision of old questions on such matters as internal migration and place of work; definition of place of residence to give maximum significance to such terms as "urban" and "rural nonfarm;" delimitation of statistical areas, metropolitan areas, urbanized areas, and the like; and the desirability of greater frequency of existing Censuses as well as development of new Censuses in such areas as tourism and transportation. The Chairman will welcome communications on any of these topics.

---John Fraser Hart, Chairman

Committee on International Fellowships

The committee published its most recent summary of international fellowships concurrently with its previous annual report in the July 1958 issue of The Prefessional Geographer, although that summary is to be construed as supplemental to the one published in the January 1958 issue. Preparation is under way at present on a new summary, scheduled tentatively for publication in the May issue, well in advance of the numerous fellowship closing dates clustered in late autumn and early winter. As in the past, this precis will attempt to bring up to date the most pertinent information relating to sources of funds for international study and research.

No conclusions have been reached as to whether the publicizing of information on international fellowships should continue in this manner. Attempts are being made to solicit the opinion of Association members on this point before a final recommendation is made.

---Donald J. Patton, Chairman

Cartography Committee

At the Los Angeles Meetings the Council approved the continuation of the work of the Cartography Committee. As the time between meetings is short, much of the effort has been toward our contribution to the Pittsburgh Meetings. In association with the Program Chairman, a Session and a Panel on cartography will be presented; a non-commercial exhibit is also planned and is being coordinated with the local arrangements committee. Special efforts have been made toward initiating interest in preparing maps for the Map Supplement of the Annals. This effort will need the support of the AAG membership during the next several years or an opportunity will be lost indefinitely. The September 1958 issue of The Professional Geographer contained a special cartographic section and although this effort did not bring the response desired, continued thought will be given to improving the contributions so that another attempt can be planned.

It is important that the objectives of the Cartography Committee be reviewed and changed or reaffirmed so that a dynamic effort can continue during the next year. It is hoped the Pittsburgh Meetings will afford an opportunity for the Committee to meet, design its program for the future, and submit it to the Council for approval.

---Robert J. Voskuil, Chairman

Committee on the Exchange of Publications

Beginning with the March 1959 issue two additional copies of the Annals will be sent to the Library of the Academy of Sciences, Exchange Department, in Leningrad.

Since November 1958, Chauncy Harris, a member of this Committee and of the AAG Executive Committee has been at the American Geographical Society three times, and the Chairman has had the advantage of personal consultation with him. In January members of the Committee were circularized on the request for an exchange by the Instituto de Geografia, Universidad de Chile, Santiago. Dr. Harris brought this up at the meeting of the AAG Executive Committee held in Washington on January 24, and it was decided that the general policies underlying the exchange program should be considered at the meeting of the full Council in Pittsburgh on Sunday, March 29, 1959.

Committee members have also been circularized concerning a request from Professor Leopold Scheidl, Geographisches Institut, Hochschule fur Welthandel, Vienna, for the Annals in exchange for the Wiener Geographische Schriften, but there has not been time for the receipt of replies.

---Nordis Felland, Chairman

Publications Committee

Since the August 1958 meetings of the Association, there has been relatively little activity on the part of this committee. Three items warrant

specific notice. 1) Miss Rhoda Heinecke of the American Geographical Society has begun the work of indexing Volumes 26 through 50 of the Annals. 2) Negotiations have been concluded with the Kraus Reprint Corporation for the purchase of back issues of the Annals and for reproduction rights on back issues. 3) Clarence F. Jones' "Report on Status and Trends of Geography 1952-57" was published and distributed as Part II of the January issue of The Professional Geographer.

Our editors have continued their excellent work in advancing the quality of the Association's publications and, thereby, in keeping us directed toward our foremost stated objective.

The terms of Harold H. McCarthy and Guido C. Weigend on the Editorial Board of the Annals come to an end at the time of the Pittsburgh meetings. In June 1959, the term of Gilbert F. White on the AAG Monograph Series board expires. The Publications Committee wishes to take this opportunity to thank these individuals for their sincere efforts.

---Henry M. Kendall, Chairman

Committee on Geographers in Business

The Committee sent out a reminder notice in September to those who had not returned their questionnaires. As a result some thirty more were sent in making a total of 156 available for analysis. Both qualitative and quantitative data are being processed and a final report is in preparation. The Committee requests continuance until it can submit its final report.

---John W. Reith, Chairman

Committee on Mass Data Processing Techniques

The committee will sponsor, as part of its report, a panel discussion on "Experience With Electronic Computers in Geographic Research" at the meetings in Pittsburgh. The discussion will be led by William Garrison, and other members of the panel are Brian Berry, William T. Fay, Edwin Thomas, and William Warntz.

Ways and means are being sought to bring new developments in data processing to the attention of the members of the AAG. As a beginning, it is hoped that a description of techniques already in use can be compiled and published soon.

A request has been submitted to the Council of the AAG for funds to conduct an inventory and compile a listing of projects completed or underway in which geographers have used mass data processing techniques. This should serve the double purpose of making more geographers aware of the wide range of possibilities for using these techniques and also of leading to the mechanical reproduction and exchange of data already coded for machine use.

During the year a number of geographers have been assisted in the solution of data processing problems.

A meeting of the committee will be held in Pittsburgh during the AAG meeting.

---Howard G. Roepke, Chairman

Air Force R.O.T.C. Committee

The Committee serves as a liaison between the Association and the Air Force R.O.T.C. program administered from the Air University. This year the Committee has not been called upon to perform any service. The annual meeting of the Association at Pittsburgh will afford an opportunity to Committee members and Air Force R.O.T.C. representatives to re-examine the function of the Committee and decide whether continuation is desirable.

---Jan O. M. Broek, Chairman

REPORTS OF AAG DELEGATES

National Council for Geographic Education

The 44th Annual Meeting of the National Council for Geographic Education was held at the Hotel Statler Hilton, New York City, on November 28-29, 1959. The program was built around the general theme "Widening Horizons Through Geographic Education." Papers were presented at the first general session by George B. Cressey, Samuel Van Valkenburg, and Chauncy Harris. The second general session was devoted to papers related to "Geographic Education Across the Curriculum" by Clyde F. Kohn, Neville B. Scarfe, and Edward G. Pleva. At the third general session papers dealing with regions of increasing importance in geographic education were read by Preston E. James, Shannon McCune, and William A. Hance. Sectional meetings were given over to discussions of tools and techniques for teaching geography, and programs of geographic education for the several grade levels. The annual banquet was held on Friday evening, at which Paul A. Siple delivered an address entitled "The First Winter at the South Pole." Delegates to various United Nations' organizations were guests of the Council at the banquet. More than 1000 persons attended the annual meeting, the largest attendance in the history of the Council at any of its meetings.

The Distinguished Service Award for 1958 was presented to Otis Willard Freeman for his many outstanding contributions to geographic education. The citation was read by Howard H. Martin, Chairman of the DSA Committee.

During the year 1958, the Council attained outstanding success with its publication program. Four professional papers, Nos. 16-19, were published; a leaflet by Mary Viola Philipps on "How to Organize a Geography Club" was made available; and the first publication in the new "Do It This Way" series, entitled, Geography Via Television, by Jewell Phelps, Peabody

College, Nashville, was distributed. In addition, the new Index to the Journal of Geography, 1922-1956, was made available, and a brochure, Careers in Geography, was distributed to high school and college advisors. These publications can be obtained by writing to Professor John Morris, Department of Geography, University of Oklahoma, Norman, Oklahoma.

The newly elected officers for the year 1959 are:
President: A. K. Botts, State Teachers College, Trenton, New Jersey
First Vice President: John W. Morris, University of Oklahoma
Second Vice President: Lyle Fletcher, Bowling Green State University, Bowling Green, Ohio
Secretary: Lorrin G. Kennamer, Jr., University of Texas
Treasurer: John H. Garland, University of Illinois
Members of Executive Board: H. Phillip Bacon, Teachers College, Columbia University; George T. Renner, 3rd., Arizona State College, Tempe; Mamie Anderzhon, Junior High School, Oak Park, Illinois.

The 1959 annual meeting will be held at the Sheraton-Cadillac Hotel, Detroit, Michigan, November 27 and 28, 1959.

A joint AAG-NCGE session under the chairmanship of Clyde F. Kohn has been set up for the Pittsburgh meeting of the AAG dealing with the topic "Teaching Geography in Our Secondary Schools." Participants will include Preston E. James, Clarence W. Olmstead, and Gilbert White. Proposals for improving the teaching of geography in the nation's high schools will be forthcoming as a result of this session.

---Clyde F. Kohn, Delegate

REPORTS OF EDITORS

Editor of the Annals

During the calendar year of 1958 the Annals carried 496 pages of printed material. The December issue carried almost twice as much material as the usual numbers (187 pages). This issue was paid out of the 1959 budget, which was increased by $1,000 over previous years, and so poses no budgetary problem for this or last year. Annals' expenses during 1958 remained just below budgetary allowances (I believe expenditures came within $20 to $30 of the budget).

The four issues printed during 1958 carried a total of 23 articles, five review statements, 3 letters and comments, six memorials, also abstracts and an index. Since the present format of the Annals carries more material per page than the old format, it is clear that a good deal more material was published during 1958 than in any previous year.

The budget last year provided for an expense item in the amount of $600. Of this amount $82 was used for postage, $26 for supplies, and the rest for editorial and stenographic assistance. The amount available of stenographic assistance was inadequate and during the past several years the University of Kansas has provided additional money to pay for stenographic help. For the present year I asked for an expense budget of $1,000 to cover all

stenographic help. This request was approved and should prove adequate. I request that this item of $1,000 be included for the budget of 1960.

The large issue of the Annals for December 1958, was well received and a number of colleagues have requested that a larger Annals be published regularly provided good material is available. At this time we do not know if an increased supply of good papers is in prospect but the possibility does exist. If the Council feels that enough money should be available to publish all good papers, the printing budget for the Annals could be increased from $9,000 to $10,000 with the understanding that the increase be used only if warranted. I refer this decision to the Publications Committee and the Council for decision.

---Walter M. Kollmorgen

Editor of Monograph Series

The Editor and Editorial Board of the Monograph Series report that the first of the Series, Richard Hartshorne's Perspective on the Nature of Geography, will appear later this spring. Several other manuscripts are under consideration for the next publication, and we hope soon to announce which one has been selected. R. J. Russell replaced F. Kenneth Hare to join Gilbert F. White and Stephen B. Jones on the Board this year. The Editor and Board continue to welcome the submission of manuscripts for consideration.

---Andrew H. Clark

Editor of The Professional Geographer

Growth seems to be a continuing condition for The Professional Geographer and one that is directly attributable to the fine cooperation of the membership in providing a steady flow of publishable material. Volume X, containing the six issues for 1958, was 63 pages bigger than the previous volume. Not all this is growth due to more content--the use of larger type and more open format accounts for part of the increase. The 340 pages in the volume were used thus: 84 pages for 20 professional notes, 75 pages of association affairs, 11 pages on regional divisions, 28 pages of announcements and reports, 23½ pages of news from 23 different geographic centers, 5½ pages of personal news, 46 pages containing announcements of 86 new publications, 5½ pages of letters to the editor, 14½ pages of thesis titles, 18 pages on cartographic topics, and 29 unnumbered pages of advertizing. As usual, thesis titles appeared in the March and November issues, and lists of international fellowships and research grants were published in the January and July issues. An unusual feature in the September issue was the section on cartography, thanks to the efforts of Fred Foster and the Cartography Committee. It contained 8 brief notes and news from 5 cartographic centers.

As in 1957, all the issues in 1958 went to press promptly on the first of the month and were in the hands of the members some ten days later. Unfortunately, this record was broken by the January 1959 issue. Part I was held in the Central Office until it could be mailed with Part II, and thus did not reach the members until late in the month.

The January 1959 issue marked a temporary departure from the normal procedures in several respects. Of course, the most obvious change was having The Professional Geographer in two parts, but in addition, there was a Guest Editor, Ruth E. Baugh, for the lengthy report by Clarence F. Jones which comprised Part II. Also, Part II was not typed by Mrs. Grace Fraley who prepares The Professional Geographer copy for press, but rather by Mrs. Ruth Griggs, the Central Office Manager. Although your editor's name was put on the cover of Part II, she joined the rest of the membership in waiting until the copy came off the press before being given an opportunity to see it. This kind of suspense fails to recommend itself.

Although for the past several years your present and previous editors of The Professional Geographer have undertaken to prepare and proofread the copy for the printing of programs for the annual meetings, this extra service had to be abandoned this year because both the program and the March issue had to be prepared at the same time during the month of February. It was with deep regret that your editor was forced by this conflict in time to suggest that other arrangements be made for the preparation of the program.

No report would be complete without sincere expressions of appreciation to all who have contributed to The Professional Geographer--to the many, many members who provide the content of each issue; to Amy M. Pruitt and her successor, Ruth Griggs, in the Central Office, who handle with efficiency the advertizing, subscriptions and distribution; to Bess Kramer and Sauls Lithograph Company, Inc., for the personal attention given to the printing of The Professional Geographer; and, lastly, a special word of gratitude to Grace Fraley whose knowledgeable assistance, great skill, and friendly cooperation not only lighten the load of your editor, but create and maintain the high standards of appearance for The Professional Geographer is justly proud.

---Evelyn L. Pruitt

AAG Executive Committee Meeting
January 24, 1959

The Executive Committee met at the Library of Congress, with all members present. Their discussions and recommendations are summarized below:

1. Mail ballot actions of Council since August meeting were reported as follows:

a. Established dates for Council meetings in Pittsburgh--March 29, 6:00 p.m. and April 1, 8:30 a.m.

b. Disapproved request from Kraus Reprint Corporation for a discount of 30% on purchases of $150 worth of Annals in a single shipment.

c. Suggested ways of implementing the campaign of the Membership Committee.

d. Authorized the Secretary to commit the AAG to participate in a conference of officers of associations in the social sciences to discuss problems concerning the neglect of the social sciences in the National Defence Education Act and the increased costs of services for professional associations.

e. Approved the appointment of a special Field Trip Committee for the Dallas meetings in 1960.

f. Approved the addition of William Whipple Abbe, John K. Kern, G. Etzel Pearcy to the Committee on Geographers in Government.

g. Recommended that a statement concerning the purpose and functions of ACLS be published in The Professional Geographer or circulated from the Central Office to improve relations between the AAG and ACLS.

2. Recommended that, subject to concurrence by the Publications Committee, the current retail price of $2 plus postage for Nature of Geography be changed to $2.75 including postage and that a discount of 30% be allowed to dealers purchasing 20 or more at one time; otherwise, the 20% discount is to remain in effect on smaller quantities.

3. Accepted Secretary's report on the actions of the following Committees: Membership Committee, Research Grants Committee, Local Arrangements Committee for Pittsburgh, and Committee on Exchange of Publications.

4. Reviewed Kraus contract because of discrepancy between the inventory on which the contract was negotiated and the issues available for shipment, and recommended that the AAG offer to reduce the price of back issues of the Annals delivered to the Kraus Reprint Corp. by 25¢ per missing item, or about $150 total.

5. Recommended, with the concurrence of Wallace Atwood, that the cost of the Jones Report on "Status and Trends of Geography in the United States 1952-1957" be divided between the AAG and the National Academy of Sciences at a ration of 9:5, and that the selling price be $2 per copy.

6. Recommended that the Secretary prepare a request to the ACLS for financial support to publish a map supplement to the Annals.

7. Accepted suggestion of the Treasurer that any income in excess of expenses be returned to the badly depleted reserve funds.

8. Approved the transfer of the Central Office checking account to a bank nearer the new location of the Office.

9. Approved space, equipment and working program of the Central Office, and recommended the purchase of additional equipment provided costs were within established equipment budget, and the employment of additional part time help.

10. Approved draft contract between the AAG and Miss Heinecke for indexing Volumes 26 through 50 of the Annals, at a cost of $2.50 per hour and not to exceed a total of $750.

11. Accepted Secretary's report on results of questionnaires on fellowships and stipends, and recommended that efforts be continued to complete the survey, that numbers be assigned to each reporting institution, and that the Secretary inform each institution of the number assigned.

12. Disapproved the establishment of a "Contributing" category of membership.

13. Deferred consideration of invitations for 1962 meetings for action of full Council.

14. Recommended that a final notice to members who have not paid current dues be sent by April 15 indicating that no publications will be sent after the March issues of the Annals and The Professional Geographer.

15. Approved in principle, subject to the concurrence of the Publications Committee, the proposal that the AAG produce a special issue or a greatly enlarged September issue of the Annals in 1960 to contain all papers which meet the editorial standards of the Annals and which are accepted for presentation at the International Geographical Congress in Stockholm in 1960. The Treasurer reported that the U. S. National Committee for the IGU might seek financial support for three travel grants to Stockholm to be given as prizes to the three geographers under age 35 who prepare the best papers for presentation at the Congress. The Executive Committee agreed that the AAG would screen such papers if requested.

16. Requested the Vice President to discuss with Division chairmen the problems of Division boundaries.

THE NATURE OF GEOGRAPHY

RICHARD HARTSHORNE

Published by
The Association of American Geographers
Fifth Printing

Copies may be obtained from the Central Office of the AAG, 1785 Massachusettes Ave., N.W., Washington 6, D. C. The price is $2.75 including postage and handling. In order to aid students, as in the past, this volume is sold at cost, with no royalties to the author.

REGIONAL DIVISIONS

Middle Atlantic Division

1. The Middle Atlantic Division held evening meetings during 1958 as follows:

20 February 1958, National Archives: Paul Siple, "The First Year in Antarctica"

1 April 1958, Library of Congress: Jean Gottmann, "Early Findings in Megalopolis" (Preceded by dinner.)

23 May 1958, Army and Navy Country Club: Newman Bumstead, "Basin of the Atlantic" (Preceded by dinner.)

16 September 1958, National Housing Center: Robert Campbell, "The Northwest Frontier"

12 November 1958, Library of Congress: Russell Fifield, "Southeast Asia: Political and Geographic Implications" (Preceded by dinner.)

2. A field trip to southern Maryland and the Northern Neck of Virginia was conducted on 7 June 1958 by Donald Patton, Field Trip Chairman, with the able assistance of Herman Friis.

3. The monthly luncheon meetings, with Richard N. Hall in charge of arrangements, were well attended.

4. The annual meeting of the Division was part of Section E of the 125th meeting of the American Association for the Advancement of Science, held in Washington. Four contributed papers in geology and geography were presented on 26 December 1958. Richard J. Lougee first presented evidence for a Champlain Marine Stage at Cochrane, Ontario. In a second paper, he proposed a radically new concept of North American glacial-age history, suggesting that there has been but a single glacial period instead of four, and that it produced two till sheets, one early in the period and one near its end. The intervening Kansan and Illinoian deposits originated from different ice centers but are identical in age and were ice-rafted in an extensive ice-front lake--made somewhat deeper than previously thought by ice-weight downwarping. Wisconsin deposits are associated with crustal recovery--not previously recognized in the Mississippi Basin.

Robert L. Austey discussed the little known contributions of Daniel Coit Gilman to the field of geography. Remembered primarily as President of the University of California and Johns Hopkins University, Gilman wrote geography texts for the country's first graded schools and concentrated on the distributional aspects of physical features. As a student of political geography he taught and lectured extensively on the geographic concepts of Carl Ritter.

Techniques developed by the Quartermaster Research and Engineering Command for making quantitative topographic generalizations were explained in the fourth paper by Will F. Thompson. A pilot study, working with maps of northwestern Africa at 1:250,000, has produced isoline maps of (1) slope from contour counts, (2) slope direction changes per mile, (3)

values for relative relief, and (4) values for topographic grain. All measurements were designed to permit accurate inter-regional comparisons.

In the first of two symposia held on 29 December, geographic research was discussed by Louis Quam of the Office of Naval Research, Norton Ginsburg of University of Chicago, and Edward Allworth of the Ford Foundation. The wealth of research and travel opportunities available to geographers and the potential for practical, utilitarian results were emphasized, but it is evident that geographers are both slow to seek and utilize these opportunities and are not well acquainted with procedures for doing so.

In the second symposium, a panel of three speakers traced the development of the St. Lawrence Seaway project, and explained its operation and expected impact. Mr. George Haering, former assistant to the administrator of the St. Lawrence Seaway Development Corporation, detailed the financial arrangements that resulted in a self-liquidating and self-financing organization. The President of the Great Lakes-St. Lawrence Association, N. R. Danielian, spoke on the long standing political and economic problems, which were not resolved until the present decade. Richard S. Thoman, Department of Geography, Northwestern University, presented detailed information based on his studies on the economic geography of the Seaway and suggested its probable effect. The presentation concluded with an excellent color film on the Seaway.

5. The Nominating Committee for candidates for 1959 comprised Robert Campbell, Lester Trueblood, and Leonard Dykes. The following officers were elected for 1959: Chairman: G. Etzel Pearcy, Program Chairman: Richard E. Murphy, and Secretary-Treasurer: Anne G. Love.

---J. Warren Nystrom, Chairman

New York Metropolitan Division

The next meeting will be held on March 13, 1959 at 7:45 p.m. at the American Geographical Society and will be concerned with current developments in the New York metropolitan region. The principal speaker will be Douglas S. Powell, Planning Director, Regional Plan Association, who will elaborate on some of the trends in land development, population, and the economy of the New York Metropolitan Region, using a series of specially prepared maps. In addition, Mr. Powell may touch upon the results of the economic studies of the Region now being carried on by the RPA under the direction of Dr. Raymond Vernon, and the increasing intensities of pressure for regional government as voiced by groups such as the Metropolitan Regional Council.

On Saturday, May 16, the annual field trip and business meeting of the Division will take place under the leadership of William A. Niering of the Botany Department of the Connecticut College, New London. Dr. Niering is currently conducting research for the Park, Recreation, and Open Space Project of the Regional Plan Association. The objective of this project is to help meet the growing need for open space by providing data and developing recommendations which will be useful to governmental and other agencies

having the responsibility for the acquisition and preservation of parks and other open land. Several of the more interesting "open spaces" will be visited and analyzed.

Geographers in Government Services*

The Committee believes its main functions and objectives to be as follows: (1) To represent and promote the interests of the geographic profession in general and of the AAG in particular. This involves close liaison with the Civil Service Commission and the various Federal departments and agencies. (2) To handle special problems or to undertake special projects related to the objectives under (1), such as personnel inventory of geographers in Government service, historical survey of the status of geography in Civil Service, and inventory of geographic programs in the Federal Government. (3) To cooperate with the Placement Committee in gathering and disseminating information about, and developing opportunities for, geographers in Government. (4) To assist the Committee on the Status of Geography to obtain the information it needs on geography in Government.

The principal accomplishments resulting from the five meetings held since September 1958 are as follows: (1) The name of each geographer in Government is recorded on a 3x5 card and includes minimum information such as name, agency, position and personnel classification (e.g., geographer, economist, military intelligence research specialist, cartographer, program officer). (2) A project has been initiated to explore the status of geography in Civil Service, with the ultimate purpose of creating a more appropriate role for geography in the personnel classification structure of Federal agencies. The Committee, therefore, seeks to expand the scope of the present Civil Service concept of geography and at the same time to develop opportunities for geographers in certain programs where none is now employed. The Committee recognizes, however, that some jobs performed by geographers in Government may more appropriately be classified as something other than "geographer." (3) The Committee is cooperating with the Placement Committee in developing a list of Government offices which employ, or might employ, geographers. (4) Plans are being made to assist the Committee on the Status of Geography in gathering data for its next biennial report covering the period 1958-1959.

---Lloyd D. Black, Chairman

*Received too late for inclusion in proper order

ANNOUNCEMENTS AND REPORTS

Against Geography

A condemnation of geography as not being worthy of holding a place as an Honours subject in British universities has been written by Tudor David, assistant editor of Education and published in the May 1958 issue of Universities Quarterly, Volume 12, Number 3, (10 Great Turnstile, W. C. 1, England). His comments should promote serious thought by all geographers.

Foreign Field Research Program

Awards to 13 applicants for support of field work in foreign areas have been announced by the Division of Earth Sciences of the National Academy of Sciences-National Research Council. This is the largest number of awards to be made since the program of support began four years ago, and was made possible through an increase in the funds which are provided by the Geography Branch of the Office of Naval Research. The 1958 awards bring to 37 the total of geographers, mainly doctoral candidates, to obtain funds for transportation, subsistence, materials, and other expenses for field work abroad. The successful applicants were selected in December by a screening committee composed of Robert Cushman Murphy, Richard J. Russell, William C. Steere, and Edward B. Espenshade, Jr. (ex-officio and Chairman-Elect of the Division of Earth Sciences). Their selections are as follows:

Name	Brief Title	Months in Field
Richard E. Guffy Department of Geography Northwestern University Evanston, Illinois	A Statistical Analysis of Fragmented Holdings in Northern France	9
Walter H. Hambuechen Department of Geography University of California Berkeley 4, California	The Biogeography of Introduced Foraging Animals in Polynesia	20
Ronald A. Helin Department of Geography University of California at Los Angeles Los Angeles 24, California	Economic Reorientation in Post-War Karelia, Finland	12

Charles F. Heller, Jr. Department of Geography University of Illinois Urbana, Illinois	Changing Role of Wheat in South Centerbury, New Zealand	8
Charles M. Hoskin Department of Geology University of Texas Austin, Texas	Carbonate Sedimentation on the Alacran Reefs, Campeche Bank, Yucatan	4.5
Martin E. Johnson Department of Geography University of California Los Angeles 24, California	Urban Geography of Addis Ababa, Ethiopia	12
Robert O. Johnsrud Department of Geography Northwestern University Evanston, Illinois	Outside Influence on Economic Geography of Hausaland, Nigeria	8
John F. Kolars Department of Geography University of Chicago Chicago 15, Illinois	Uses of Resources in South-Central Turkey	14
Paul L. Lehrer Department of Geography University of Nebraska Lincoln, Nebraska	Geography of Native Agriculture in Kenya	13
Leland R. Pederson Department of Geography University of California Berkeley 4, California	Mining Economy of Norte Chico, Chile	13
N. Manfred Shaffer Department of Economic Geography Columbia University New York 27, New York	The Competitive Position of the Port of Durban, Union of South Africa	15
Lee M. Talbot Department of Geography University of California Berkeley 4, California	Ecological Study of the Big Game of the Serengeti Plains, Nairobi	17

Paul P. Vouras
Department of Social Science
Paterson State College
Paterson, New Jersey

Post-War Changes in the Economy of Northern Greece 17

New Monograph Series

The Graduate School of the University of Florida is initiating a scholarly series to be entitled University of Florida Monographs: Social Sciences. The series will be devoted primarily to the publication of research by present and former members of the scholarly community of the University. Four numbers will be published each year with the first appearing early in 1959. Monographs will be drawn from the fields of anthropology, economics, history, political science, sociology, and from appropriate areas in education, geography, law, and psychology. Editorial communications should be addressed to L. N. McAlister, 111 Peabody Hall, University of Florida, Gainesville, Florida. Business correspondence should be directed to Lewis F. Haines, Director, University of Florida Press, Gainesville, Florida.

Survey of Latin American Studies

A survey of investigations in progress in the field of Latin American is being cosponsored by the Department of Cultural Affairs of the Pan American Union and the School of Inter-American Studies of the University of Florida at Gainesville. Questionnaires have been sent to faculty members and graduate students in all disciplines, and to independent scholars and researchers who may have investigations under way connected with Latin America. Those who do not receive questionnaires through the mail are urged to request them from the School of Inter-American Studies, University of Florida, Gainesville, Florida, in order that the published results may be as complete as possible. Deadline date for receipt of the completed questionnaires is 15 April 1959. Distribution of the survey is scheduled for early fall.

Photo and Mapping Meetings

The American Society of Photogrammetry and the American Congress on Surveying and Mapping will hold consecutive meetings from March 8 to 14 at the Shoreham Hotel in Washington, D.C. Among the subjects included in the ASP sessions are: color and infrared photography; applications of photogrammetry to missile testing, tracking devices, radio telescopes, aircraft wing characteristics, radar, mapping, and triangulation; equipment and automation; and the past, present, and future of photogrammetry. The ACSM program includes discussions of the educational programs in geographic cartography and in surveying; topographic, aeronautic, and other

mapping; instruments; cartographic source materials; and mapping methods and techniques.

New Location for AAG Central Office

The AAG Central Office has moved from the Library of Congress into space rented from the National Academy of Sciences in the American Council on Education Building, 1785 Massachusetts Avenue, N. W., Washington 6, D. C. The Office Manager is Mrs. Ruth T. Griggs and her assistant is Mrs. Lois Goulart.

AAG Annual Meeting in Pittsburgh

You are reminded that the 55th annual meeting of the AAG will be held in Pittsburgh on March 29 to April 2. Attention is called to previous announcements in recent issues of The Professional Geographer and to the Preliminary Program which is printed in the January issue of The Professional Geographer. The headquarters hotel, The Penn-Sheraton, advises that room reservations should be made before the opening of the meeting. It is expected that the registration fee will be $3.00 with half fee for full-time students.

This convention is held during Pittsburgh's Bicentennial Year, which commemorates British victory over French forces on "The Point" where the Ohio River forms. This action facilitated the growth of Pittsburgh as a gateway for the settlement of the Middle West. Pittsburgh extends to you a special welcome during its Bicentennial Year.

---Norman Carls, Chairman

Geography Grants-In-Aid

As a preliminary step in making a survey of grants-in-aid and stipends available to graduate students in geography, a list of universities said to grant the Ph.D. in geography was published in the November 1958 issue of The Professional Geographer under the heading "Is This Correct?" Responses to that list have enabled the compilation of a new, presumably complete list of universities currently granting the Ph.D. in geography, as follows:

Boston, Boston
California, Berkeley
California, Los Angeles
Chicago, Chicago
Clark, Worcester
Columbia, New York City
Florida, Gainesville
Johns Hopkins, Baltimore
Minnesota, Minneapolis
Nebraska, Lincoln
North Carolina, Chapel Hill
Northwestern, Evanston
Ohio State, Columbus
Peabody, Nashville
Pennsylvania, Philadelphia
Pennsylvania State, University Park

Illinois, Urbana	Pittsburgh, Pittsburgh
Indiana, Bloomington	Stanford, Stanford
Kansas, Lawrence	State University of Iowa, Iowa City
Laval, Quebec	Syracuse, Syracuse
Louisiana State, Baton Rouge	Tennessee, Knoxville
Maryland, College Park	Texas, Austin
McGill, Montreal	Toronto, Toronto
Michigan, Ann Arbor	Washington, Seattle
Michigan State, E. Lansing	Wisconsin, Madison

In addition, there are three institutions in a somewhat marginal position with respect to the Ph.D. in geography: 1. The New School for Social Research does not grant the Ph.D. in geography, but permits candidates for the Ph.D. in economics or political science to specialize in economic and political geography; 2. Oregon State College permits students from the Department of Natural Resources, which is headed by a geographer, to work toward an interdepartmental Ph.D. in science; 3. At Yale University a few students have been admitted to an ad hoc program during the past 9 years and one has obtained the Ph.D., but there is no formal Ph.D. program in geography.

Questionnaires on grants-in-aid and stipends for geography graduate students were circulated, and responses from most of the above institutions were tabulated. Because several institutions placed restrictions on the publication of data supplied to the AAG Central Office, only generalizations can be presented here. If specific information is desired about an individual school, questions should be directed to the chairman of the Geography Department or the administrative officer of that school. Questions of a more general nature, which are not answered in the summary and table below, will be welcomed by the AAG Secretary who will provide any responses that can be interpreted from the questionnaires without violating restrictions established by the contributing institutions.

1. The number of graduate students in residence per university ranges from 3 to 40, with the median at 22.

2. The most frequent grant to graduate students is in the form of assistantships. The number granted per university this year ranges from 1 to 23, with the median at 8.

3. The value of assistantships ranges from $400 to $2,600 for the academic year of two semesters or three quarters. More than two thirds of the grants are within $200 of the median which is $1800.

4. Scholarships in geography are granted by less than 40% of the institutions and in all but three cases are limited to one or two each. The situation is similar with respect to fellowships. In general, the scholarships and fellowships require no duties and scholarships seldom cover more than tuition.

5. Most of the grants are made with remission of tuition so that in effect they are tuition free. In state universities the grants usually remit out-of-state fees but require the payment of fees that would normally be charged to residents.

6. About 25% of the reporting institutions require some teaching of

regular classes by advanced graduate assistants. Most of the assistantships involve 6 to 9 hours of teaching per week in quiz sections or laboratories with some additional time spent on grading papers. Research assistantships normally pay higher rates but require 10 to 20 hours of service per week.

7. Only 15% of the universities have special projects with foundation or government support for graduate geography majors.

8. The number of hours of graduate work permitted for students who have assistantships varies, even within each institution, but it appears that most departments limit the scholastic workload to some extent. On a semester hour basis the workload permitted to graduate students varies from 6 to 15 hours, with a median at 12 hours.

In the following table, "value" means cost to the student after tuition is covered for an academic year. Department size is coded according to the number of graduate students in residence: I- more than 30 students, II- 24 through 30, III- 16 through 23, IV- 10 through 15, V- less than 10 students.

Assistantship		Scholarship		Fellowship		Dept.
Value	No.	Value	No.	Value	No.	Size
$1200 - 2600	13	$200	2	$1800	1	III
12 mo. 2400	2	-	-	-	-	V
1000 - 2000	2	-	-	-	-	V
950 - 1900	9	250	1	-	-	II
900 - 1900	10	-	-	1575	1	IV
1381 - 1890	9	-	-	-	-	II
1300 - 1875	12	315 - 1600	4	1240 - 7000	7	II
1850	9	-	-	-	-	II
1820	9	-	-	8000	1	I
1800	18	-	-	1500	2	II
1800	5	-	-	-	-	V
1500 - 1800	7	-	-	-	-	IV
1500 - 1800	7½	-	-	1500	1	II
600 - 1800	3	-	-	-	-	V
850 - 1800	9	-	-	-	-	III
1209 - 1725	12	Tuition	1	varies	1	III
1710	11	Tuition	2	-	-	III
1500 - 1600	14	1000	1	1150 - 1800	5	I
1008 - 1620	8	-	-	1008	1	IV
1600	1	-	-	1200	1	V
850 - 1575	23	-	-	-	-	II
600 - 1500	8	-	-	1000 - 3000	2	III
1500	4	Tuition	2	Tuition	1	III
900 - 1400	4	-	-	-	-	V
240 - 1240	7	-	-	-	-	III
900 - 950	8	Tuition	1	-	-	II
500	3	Tuition	8	300 - 2300	10	II
400	4	Tuition	16	360 - 520	4	I

---Arch C. Gerlach

Report Available

A limited number of copies of the 80 page report on "The Status of Geography in Countries Adhering to the International Geographical Union" are available for the cost of postage. The documents were prepared and distributed as Publication No. 7 of the 17th International Geographical Congress, Washington 1952. Requests, including 12¢ in stamps or coins may be sent to the AAG Central Office, 1785 Massachusetts Avenue, N. W., Washington 6, D. C.

PERSONAL NEWS

Robert B. Johnson, previously Assistant for Operations Analysis with the Pacific Air Forces, has joined the applied research group at Boston University, in their Defense Systems Division. He can be reached at ITEK Corporation, 700 Commonwealth Avenue, Boston 15.

Frank E. Trout is now a lecturer in geography in the Department of Economics at the City College in New York. He is currently working toward his Ph.D. in Geography at Yale University.

Burton W. Adkinson, Head of the Office of Scientific Information of the National Science Foundation, has been elected to the Council of the American Geographical Society.

L. Dudley Stamp has accepted the invitation of the Pacific Science Association to be Chairman of the Standing Committee on Geography, in place of Albert Kolb.

Fernand De Percin, Chief of the Polar and Mountain Section of the U. S. Army Quartermaster Research and Engineering Command, recently returned from a three-month trip to northeastern Alaska where he conducted a meteorological study of the Lake Peters area and collected data for the International Geophysical Year.

Donald R. Dyer, on leave from the University of Florida, has been, since September, in Lima, Peru, as a Fulbright Lecturer at Pontificia Universidad Catolica del Peru and Universidad National Mayor de San Marcos. He has also been in Ecuador as a delegate to the V Pan American Consultation on Geography held in Quito, where he presented his annotated bibliography on Land Classification and Land Use Surveys in the United States.

THESIS TITLES

Thesis titles are published in the March and November issues of The Professional Geographer. Titles should be submitted to Leslie Hewes, University of Nebraska Lincoln 8, Nebraska, by February 1 and October 1, respectively.

Ph.D. Dissertations Completed

Al-Khashab, Wafig H. "The Water Budget of the Tigris and Euphrates Basin." University of Chicago, 1958.* Published: Dept. of Geography Research Paper.

Brownell, Joseph W. "Farm Land Abandonment in the Northwest Adirondack Foothills." Syracuse University, 1958. Microfilmed. /D.S.S./

Dethier, Bernard E. "The Problem of Early Man's Entry into the New World." Johns Hopkins University, June 1958.

Hauk, Sister Mary Ursula "Changing Patterns of Catholic Population in Eastern United States (1790-1950)." Clark University, 1958.*

Knadler, George A. "Isaiah Bowman, Background to His Contribution in Thought." Indiana University, June 1958.

Moore, Faith Sawyer "Flood Control Dam Preference: A Study in Three Communities of the Connecticut River Valley." Syracuse University, September 1958.* Microfilmed. /D.S.S./

Wood, Harold "Departement du Nord, Haiti: A Study of Land Utilization and Settlement." University of Toronto, 1958.*

Ph.D. Dissertations in Process

Bone, Robert M. "The Economic Development of the Canadian and Soviet Northlands." University of Nebraska.

Briere, Roger "The Supplying of Montreal with Agricultural Products." University of Montreal.

Fast, Nathan "Oyster Production and Cultch Diversion in 19th Century Maryland." Johns Hopkins University.

Goodfellow, Joan "Land Use Capabilities of New Brunswick." University of Toronto.

Nelson, James Gordon "Geography of the Balsa." Johns Hopkins University.

Robitaille, Benoit "Geomorphologie de la partie S. E. de l'Ile Cornwallis, Iles-de-la-Reine-Elisabeth, District de Franklin, T.N.O." Universite Laval, Institut de Geographie.

*Available for inter-library loan

Vogel, Philip E. "A Geographic Analysis of the Impact of Irrigation in the Republican River Valley in Nebraska and the Solomon River Valleys in Kansas." University of Nebraska.

Warkentin, John "The Mennonite Settlements in Manitoba: A Study in Historical Geography." University of Toronto.

Masters' Theses Completed

Ballas, Donald J. "The Eastern Cherokee Indian Reservation of North Carolina: A Geographic Study." University of Pittsburgh, 1958.

de la Barre, Reamor Robin "The Chesapeake Bay Indian Population." Johns Hopkins University, November 1958.

Boley, Robert Eugene "Manufacturing Structure of Prince George's County, Maryland." George Washington University, June 1958.*

Cirino, Michael R., Jr. "An Evaluation of Modern Maps Available for South America." University of Maryland, 1958.*

Cunningham, Griffiths L. "The Manitoulin District: A Geographical Survey." University of Toronto, 1957.*

Davis, John Tait "An Analysis of the Interrelationships of Urban Economic Functions." George Washington University, June 1958.*

Ellefsen, Richard A. "Displacement of Dairy Land by Subdivision Encroachment in the San Francisco Bay Area." Clark University, 1958.

Engle, Edison Grove, Jr. "The Climate of the Washington, D. C. Metropolitan Area." George Washington University, October 1958.*

Gallion, Gene William "The Changing Patterns of Wheat Distribution in Illinois." Illinois State Normal University, August 1958.

Graff, John "Settlement Patterns in West Deer Township 1900-1957." University of Pittsburgh, 1958.

Hanten, Edward "An Analysis of the Industrial Potential of Johnstown, Pennsylvania." University of Pittsburgh, 1958.

Hardwick, Walter G. "The Effect of the Proposed Moran Dam on Agriculture within the Middle Fraser Region, British Columbia." University of British Columbia, October 1958.*

Hickey, Joseph E., Jr. "Recent Geographic Changes in Central Labrador." Clark University, 1958.

Jirak, Ivan "A Television Program About Caves as One of a Suggested Series to Propagate Geographic Information to the General Public." University of Pittsburgh, 1958.

Kersch, Edward S. "Boundary Problems of the Jordan Valley." Clark University, 1958.

Kripowitz, John "The Impact of Jet Aircraft on Air Passenger Operations at the Pittsburgh Airport." University of Pittsburgh, 1958.

Litke, Leonard "The Question of Oil Imports into the United States." Columbia University, 1957.*

McCarty, Wayne "A Geographic Study of the Resource Utilization of Sullivan County, Pennsylvania." University of Pittsburgh, 1958.

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Meghu, Joyce "Some Aspects of the Physiography of Trinidad and Their Relations to Its Economic Geography." University of Toronto, 1957.*

Mika, Paul John "An Inventory of Potential Industrial Sites: Fairfax County, Virginia." George Washington University, October 1958.*

Mirheydar, Dorreh "Transportation Routes of Iran." Ohio State University, December 1958.

Mobley, Leroy "Popcorn in the Cropping System of Gallatin County, Illinois." Southern Illinois University, June 1957.*

O'Neal, James David "The Political Geography of the Argentine-British-Chilean Sector of Antarctia." George Washington University, 1958.*

Pine, Robert H. "The Southern Province of Nyasaland: A Regional Study." Columbia University, 1958.*

Potter, Elaine I. "Dalton, Massachusetts." Clark University, 1958.

Rickert, John Earl "Urbanization in Franklin Township, Somerset County, New Jersey." Rutgers - The State University, May 1958.

Slomowitz, Hyman "The Present and Future Place of Forests in the Economy of Israel." Columbia University, 1958.*

Solodyna, Raymond Cashimir "Urban Micro-Field Studies Bloomington-Normal, Illinois." Illinois State Normal University, August 1958.

Stathers, Jack K. "A Geographical Investigation of Development Potential in the Squamish Valley Region, British Columbia." University of British Columbia, October 1958.*

Turnbull, Thomas "A Functional View of Churchill, Manitoba." Southern Illinois University, June 1958.*

Wood, John David "Dumfries Township, Upper Canada, 1816-1852." University of Toronto, 1958.*

*Available for inter-library loan

Alan Parker Mewha died on December 13, 1958 at the age of 46. He was born and grew up in Chester, Pennsylvania, and took his undergraduate work at State Teachers College, West Chester, receiving the B.S. degree in 1936. He taught for several years in the public schools of Chester before going to Columbia University where he was awarded the M.A. degree in 1943 and the Ph. D. in 1951. During this period he also served in the Air Force and, later, with the Naval Reserve. Following his release from the Navy in 1946, he continued his work toward the doctorate while teaching at State Teachers College in West Chester and advancing to full professor. In 1956 Dr. Mewha went to State Teachers College in Indiana, Pennsylvania, as Head of the Department of Geography, a position he ably filled until his death. He was an active participant in the National Council for Geographic Education and the Pennsylvania Council of Geography Teachers, and was currently serving on its Board of Directors as a past president. He was the author of several articles in the Journal of Geography, his latest, entitled "Six Dates: Six Geographies," will be published in the near future. He also contributed the chapters on "The World's Atmosphere" and "Petroleum: A World Resource" in Global Geography by Miller, Renner and Associates.

Dr. Mewha had wide research interests and a contagious enthusiasm for geography, as well as a real devotion to teaching and to his students. In memory of Dr. Mewha's achievements at Indiana State Teachers College, members of the Department of Geography and Dean of Students, Dr. S. Trevor Hadley, have established a Memorial Student Loan Fund to which anyone may contribute and from which students may borrow needed money to complete their education in geography.

Arnold Roy Frank died on December 22, 1958 at the age of 54. He was born in Buffalo, New York, but spent a considerable portion of his life in the Baltimore-Washington area. In 1926 he received the B.A. degree from Johns Hopkins University, and two years later was awarded the M.A. degree by the same institution. His degrees were in mathematics and English, although his interests later turned to geography in which he took considerable graduate work at George Washington University, American University and the Graduate School of the Department of Agriculture. He combined his mathematical and geographic interests in his various positions in the Bureau of the Budget, Bureau of the Census, and the Marketing and Transportation Research Section of the Department of Agriculture, and as a research analyst at the University of Pennsylvania. At the time of his death he was with the Bureau of Labor Statistics. During his membership in the ASPG and the AAG, he was a most active participant in meetings and field trips of the Middle Atlantic Division.

NEWS FROM GEOGRAPHIC CENTERS

Southern Illinois University

Eighteen graduate students in geography are doing Master's Degree work on campus this year. Among them are students from North Dakota University; the University of Illinois; State Teachers, Whitewater, Wisconsin; Harpur College; Indiana State Teachers, Pennsylvania; West Chester State Teachers, Pennsylvania; Punjab University, India, and Taiwan State University.

The Mississippi Valley Investigations program at the University is now in its second year under the leadership of Charles C. Colby. This undertaking is interdisciplinary in nature and includes both a research program and a seminar. Floyd Cunningham, Carl Swisher, and Robert Harper of the department have been among the more than 50 faculty members attending dinner-seminar meetings to hear reports on the area and studies in progress. Several staff members were active in the research program of the Investigations last summer. Dr. Colby and Mitchell Zadrosny of Wright Junior College made a study of drainage districts along the Mississippi Valley in Iowa and Illinois; Robert Harper carried out a reconnaissance of the Lower Ohio Valley; and Carl Swisher completed a preliminary land-use study of the Big Muddy River watershed. Graduate students Robert Holz, Leroy Okeson, and Orville Williams assisted in the program. The first publication of the Mississippi Valley Investigations, A Handbook of Basic Data for a Section of the Middle Mississippi Valley by Robert G. Layer and Robert A. Harper can be obtained by writing to Dr. Colby.

Two members of the department led summer tour groups last year. Floyd Cunningham took a group around the world with major stops in Greece, Egypt, India, Burma, Indonesia, Hong Kong, and Japan. Franklin Stern for the third time took a party to Scandanavia.

Marjorie Shank will teach this summer at the University of British Columbia. Ronald Beveridge continues research on migration of people in Illinois, an expansion of his doctoral dissertation. Robert Buzzard, President Emeritus of Eastern Illinois University, is completing his second year as Visiting Professor and is looking forward to an Arizona assignment next year. Annemarie Krause heads a committee examining the social studies teaching program. Dalias Price left the staff this year to become Chairman of the Geography Department at Eastern Illinois University. Patrick Tyson, who is completing his dissertation at the University of Michigan, has been added to the staff this year. John Hopkins will be on leave for the spring quarter to work on his dissertation at the University of Minnesota.

Delegations from the department attended both the East Lakes and West Lakes Divisional Meetings last fall and a group visited the new geography

building at Memphis State University just before its formal dedication while on a field trip in urban geography. The group toured the port and industrial developments at Memphis and spent a day with Mr. Perkins, Senior Planner of the Memphis-Shelby County Planning Commission.

De Paul University

During the 1958 summer term, Richard Houk, Department Chairman, handled the two courses on geography that were an integral part of Ohio State University's special session on Africa. G. P. Patten of Ohio State University replaced him in teaching the departmental courses during De Paul's first summer session. In August, Dr. Houk attended the AAG meetings in Santa Monica where he presented a paper dealing with Portuguese agricultural colonization in Angola and participated on a panel concerned with the relationship between geography and a television. During the return journey to Chicago, he visited the Departments of Geography at Stanford University and the Universities of Washington and British Columbia. In early September he participated in the first national meeting of the African Studies Association in Evanston by presenting a paper on Portuguese colonization in Angola.

During the current year the Department has been strengthened by the addition of two part-time staff members. George Rheumer of the University of Illinois (Navy Pier) is teaching one course each quarter. Joseph Smutnik, recently appointed Research Editor in charge of Statistics for Rand, McNally and Co., is now teaching the introductory course. Next year, Mr. Smutnik, plans to introduce a new course on "Maps and Man." Another new course, "The Geography of the Chicago Metropolitan Area," based primarily upon student field studies, also is being planned for next year.

The Department is participating energetically in many aspects of the University's program of extra-curricular community education. Together with the Department of Political Science, it sponsors the De Paul Forum on World Affairs, a monthly series of public discussions on current centers of international crisis preceded by explanatory documentary films. Dr. Houk prepared and participated in five half-hour radio programs for NBC as well as a television program that considered current political and economic developments in Africa. In November he presented a highly visual "Report Africa" to the members of the Wisconsin State Association for Geographic Education. Currently he is planning the first De Paul study tour around the world, an aerial odyssey scheduled for next summer to some twenty countries of Asia, Africa, Europe and the Pacific. Academic credit in geography will be available to those students complying with the university's regulations.

Los Angeles Geographical Society

Clifford MacFadden of the University of California, Los Angeles, speaking on "A Geographer's Impressions of the U.S.S.R." at the January meeting of the Society gave a most worthwhile illustrated account of his journey by train, car and river boat through the cities of Moscow and Leningrad, the industrial and agricultural centers of the Ukraine, and the resorts of the Black Sea area. He stressed the important place held by geography in the educational program of the Soviet Union and the prestige accorded professional geographers. At the February meeting, Charles F. Bennett spoke on "Panama, Land of Contrast" and illustrated his informative talk with his kodachrome slides.

Concluding session of the 1958-59 Program of Popular Lectures are:

April 3 - June Carroll of Los Angeles City College, "Contrasting Landscapes in Quebec"

May 2 - Carl Sauer of the University of California, Berkeley, /no announced title/

June 5 - Robert Newcomb of Los Angeles State College, "The Celtic Borderlands of the British Isles"

University of British Columbia

In January 1959, the oldest geography department in Canada became the newest and largest department of geography in Canada. In 1922 the department of Geology and Mineralogy became the department of Geology and Geography at the University of British Columbia, and was the first university in Canada to have the title Geography officially attached to a department. For more than 20 years the geography courses were taught by geologists in the department, and it was possible for students to take a geography major. In the late 1930's the development of geography was helped by visiting American geographers during the summer sessions, notably Stephen Visher from Indiana and Eric Faigle from Syracuse. (This interest and encouragement of Dr. Faigle and the staff of Syracuse University was apparent when in the early 1950's five out of the seven geography professors in Western Canada were Syracuse-trained.)

After World War II, when for the first time Canadian geographers became available, the university expanded the department by adding staff with advanced geography degrees. Tom Weir, now Head of the Department of Geography, University of Manitoba, came as an Instructor in 1945, and J. Lewis Robinson was appointed Associate Professor of Geography in 1946 to organize a geography curriculum. From an enrollment of about 200 students in 6 geography courses, and about 10 majors in 1946, the geography work expanded to a post-war height of 600-700 students in 14 courses and about 60 majors and 8 or 9 graduate students in the early 1950's. In 1953 the department was separated into two autonomous divisions of geology and geography under separate Chairmen and with the Head of the Department being the Dean of Applied Science.

After the departure of the war veterans total university enrollments declined, but again began rising about 1955. The transfer of the Teacher-training College to the University further increased the number of students choosing geography as one of their majors for social studies teaching. By about 1956 geography under-graduate enrollments at U.B.C. became the largest in Canada, replacing Toronto which had a much larger total university enrollment. In 1958-59 there were 1,250 students registered in 12 full-year undergraduate courses, there were 60 geography majors, 9 graduate students (6 of whom came from other universities), and there were 6 full-time staff members and 3 part-time members.

At the same time geography was expanding as a "teaching subject" in the B.C. school system, and a large number of teachers returned to summer session to take geography courses. Taking advantage of the climatic attraction of the west coast summer and the scenic setting of the city and university, the geography summer school has been encouraged and now brings in five or six visiting geography professors each summer and has enrollments of more than 500 students.

In the Faculty of Arts and Science no geography courses are required, and yet geography enrollments rank in 8th place among the 16 departments (excluding English and Mathematics which are required of all students). The First Year Physical Geography course is credited as a Science elective and has an enrollment of 600 students this year in 3 lecture sections and 18 lab sections. The Third Year Meteorology and Climatology course is required for all First Year students in the Faculty of Forestry. The Second Year Economic Geography course is recommended for Second Year students in the Faculty of Commerce. Of the 60 geography majors more than half plan to enter the teaching profession, and almost half are double majors, combining History with Geography.

In the 12 years after 1946 there have been 54 students registered for graduate work. Of the number, 12 have gone into the teaching profession, 11 are employed by the provincial and federal governments, 8 are proving the value of geographical training in business or industry, and 5 have entered the planning field. Four have continued their graduate training to become university geography professors.

NEW PUBLICATIONS

The Heat Balance of the Earth's Surface. M. I. Budyko. Translated by N. A. Stepanova from Teplovoi Balans Zemnoi Pverkhnosti, Leningrad, 1956. U. S. Weather Bureau, 1958, 259 pp multilithed. For sale by Office of Technical Services, Dept. of Commerce, PB 131 692, $4.00.

A. I. Voeikov, the nineteenth century Russian geographer, said (in "Climates of the Earth") that "one of the most important problems of physical sciences at the present time is the bookkeeping of solar heat amounts received by the earth." In the twentieth century, this problem has loomed ever larger in climatology. It is encouraging to know that it is being attacked by a number of physical geographers, in the Principal Geophysical Observatory in Leningrad (which bears the name of Voeikov). Many of the results are presented by Budyko. His book was received in the United States during meetings of the WMO Committee on Climatology in 1957, and has been translated under sponsorship of the Weather Bureau, the Snow, Ice and Permafrost Research Establishment, and the Quartermaster Research & Engineering Center. It has much to offer physical and regional geographers, because it deals with the processes - radiation balance, turbulent exchange, evapotranspiration, plant needs, and microclimate -, and also with the 'geographic regularities' seen in world maps of these heat-balance components.

After reviewing recent research (95 bibliography items in western languages, 250 in Russian), Budyko discusses formulas for deriving heat-balance terms from standard observations, noting that maps of derived climatic elements date from Humboldt. The yearly regimes of the components, at stations typifying Alisov's climatic regions, turn out to be very useful in teaching, since they bridge the gap between precipitation and temperature regimes. World maps show distributions of heat-balance components, though not in such detail as in the companion "Atlas of the Heat Balance" (1955).

A climatic classification employs total income from net radiation as the heat coordinate, and the ratio between this value and the heat required to evaporate the annual precipitation (the Dokuchaev-Vysotskii index) as the moisture coordinate. This index has also been applied by Grigor'ev and other geographers to geographic zonality, since it affects biological activity and formation of soil.

Next is a discussion of heat-balance aspects of microclimatology, particularly in ameliorative measures - shelterbelts and irrigation. The last chapter gives heat and moisture values for latitudinal zones, continents, oceans, and the whole earth.

This translation, which has few typographic errors, contains all the figures of the original and makes available work that has been out of the

reach of many American geographers. It represents an important advance in an important part of the field.

---David H. Miller

How Come It's Called That? Virginia Madison and Hallie Stillwell. University of New Mexico Press. Albuquerque, 1958. 129 pp. illust. $4.25.

Mrs. Madison's first book, The Big Bend Country, was reviewed in the September 1956 PG, VIII, 5. In the course of collecting the material for that one, the author concluded that the place names of the area merited a separate volume. Her collaborator, the widow of Roy Stillwell, has lived in the Big Bend since 1910. She not only knows the area and its people but also served on a committee appointed by the Governor of Texas to select names for features in the Park area. Together and separately they have run down legends, traced the names back on old maps, and dug into records of many kinds in many places.

The authors are quite confident that you will come to visit their beloved Big Bend and suggest that "if...you wonder at the peculiar-sounding name attached to some remote place, or if there seems to be no logic whatever in the name of a spring, mountain or canyon, drag out this little volume and find out how come it's called that...a story about the naming of some landmark...will give you a bright peg upon which to hang your memory of that place".

The "bright pegs" in the book are related straightforwardly, and the occasional use of regional idiom is natural and unaffected. Though this is primarily a book to be read rather than consulted, the index is adequate and much material is not available elsewhere in print. Alternative explanations of names that are current are included, sometimes with, sometimes without an indication of relative authenticity. A few "origins" are reported as still unknown. The sources of the "bright pegs" are generally given. The occasional categorical statements about name-origin that are not documented are presumably drawn from Mrs. Stillwell's knowledge. The endpaper map of the Big Bend and the one-page map of the Chisos Mountains are helpful as far as they go. Eight large photographs help one to visualize the kinds of features and places that bear the names.

The book accomplishes its objective. When you go to the Big Bend you will see things in more meaningful relations because of the "bright pegs" that have been so carefully checked and so entertainingly put down for all to share.

---Meredith F. Burrill

Geography of Commodity Production. Richard M. Highsmith, Jr. and J. Granville Jensen. J. B. Lippincott Company. Chicago. 1958 xvi and 462 pp. illust.

Commodities, "all those moveable materials and things that have economic value," are considered as part of complex interrelations in which

the land, the people, technology, social organization and a number of other factors play important roles in influencing production, distribution and trade. To describe each commodity in terms of its individual relations, commodities have been grouped under four heading: those derived from agriculture, from the sea and forest, from mining, and from manufacturing. Each of the four parts of the book opens with a section on the factors involved in the whole group of commodities, and general information on production, processing, distribution, and such influences on uses and trade as government policies and social development. This is followed by a consideration of each commodity and its major producing areas. Numerous tables, graphs, maps and pictures enhance the readable text. Selected references have been included for each commodity, and the book is very adequately indexed.

Published Maps of Montana. Vincent K. Shaudys. Regional Study No. 9. Bureau of Business and Economic Research. Montana State University. Missoula, Montana. June 1958. 55 pp.

Few geographers would have guessed that Montana has been given as much mapping attention as is indicated by this annotated bibliography of easily available maps on the whole or parts of the state. Maps are listed according to their source, that is, the federal, state, county, or private agency that produced them. Each map is briefly described. Information is also provided on how to obtain the maps. Undoubtedly this helpful and comprehensive bibliography will be welcomed by business, professional and student groups in Montana, and it is to be hoped that it will be followed as an example by other states.

Atlas of Illinois Resources: Section I, Water Resources and Climate. Produced by the Department of Geography, University of Illinois, for the Division of Industrial Planning and Development of the Department of Registration and Education, State of Illinois. 1958. 58 pp.

This is the first of a series of map and text descriptions of the economic resources of Illinois, designed to present information of use to industry, commerce, education and government. Section I is really in two parts. The first part includes 11 pages of maps on various aspects of the state's water resources, such as runoff, the hydrologic cycle, surface water, ground water, aquifers, irrigation, and mineral quality of water. Opposite each map page is an informative brief discussion. The section on climate includes 8 pages of maps with an opposite page of description on precipitation, icing, storms, temperature, degree days and growing season. Other pertinent information, such as state water laws, agencies concerned with water supplies, and a list of selected references are included. A fold-in map of the distribution of urban population completes this spiral-bound, expandable atlas. The maps are uncluttered, readable,

and in color. The whole presentation is as pleasing as it is informative, and sets high standards to be maintained in succeeding sections which will cover minerals, commercial forests, wildlife, recreation, transportation, manufacturing, labor supply, population, education, markets, agriculture, public utilities, government, and industrial potential.

The Economic Development of the Western Montana of Central Peru as Related to Transportation. Wolfram U. Drewes. The Peruvian Times. Lima, Peru. 1958. iv and 44 pp. illust. $2.00.

Four areas in the western montana were examined in detail in order to provide lacking factual data on which to make an assessment of the importance of transportation in the economic development of the whole region. The areas were selected as typical of different stages of development and road penetration: Pozuzo, in the north-central part of the study area is reached only by mule transport; just to the south, the Chanchamayo-Oxapampa area is served by one road to the Pacific; Tingo Maria-Pucallpa area, to the north, has connections to the Amazon; and in the south is the semi-isolated Satipo area which lost its only road during an earthquake. To place these areas in their geographic setting, the whole region of the eastern Andean slopes is described as to its relief, climate and vegetation. Then each area is described in terms of its physical setting, climate, vegetation, settlement, population, economy, and transportation. The differences and similarities of the areas are then discussed, particularly as they are indicative of the relation of transportation to economic development. This study is well illustrated with fine pictures, maps and graphs. It is a useful contribution to the geographic knowledge of this part of Peru, and also to transportation and settlement geography.

The publication may be obtained by sending $2.00 U.S. or 40 soles to The Peruvian Times, Jiron Carabaya 928, P. O. Box 531, Lima, Peru.

Multiple Purpose River Development: Studies in Applied Economic Analysis. John V. Krutilla and Otto Eckstein. The Johns Hopkins Press. Baltimore. 1958. 301 pp. illust. $4.50.

Water-Resource Development: The Economics of Project Evaluation. Otto Eckstein. Harvard University Press. Cambridge. 1958. Harvard Economic Studies. Vol. CIV. 300 pp.

Efficiency in Government Through Systems Analysis with Emphasis on Water Resources Development. Roland N. McKeon. John Wiley and Sons, Inc. New York. 1958. 336 pp.

These three books taken together mark an important milestone in thinking about the economic implications of managing water resources for multiple purposes. They apply to the interlocking problems of designing and selecting socially justified engineering works the modes of analysis that economists have built up. In somewhat different ways they outline the economic theory involved and then show its relevance to appraisal of particular projects. The result is a marked advance beyond the traditional cost-benefit

practice of Federal agencies in isolating certain of the income and cost effects of public investment in water facilities, and in identifying problems of choice and justification.

Of the three, the Eckstein volume probably is the best introduction to the problem for the geographer. It surveys the methods followed by the Corps of Engineers and the Bureau of Reclamation in estimating cost-benefit ratios for flood control, navigation, irrigation, and electric power projects, and bases appraisal upon the theory of welfare economics. Improvements in measurement techniques are suggested, and the limitations of these methods in underdeveloped countries and in the face of depression or of large intangibles are recognized.

The joint work by Krutilla and Eckstein provides a more sophisticated appraisal of 1) the means by which efficiency or contribution to national income and product may be estimated for a water development, and 2) a means of estimating the consequences of income redistribution from any particular development. The theory of efficient resource allocation and the social cost of Federal financing are examined. The form of analysis is then applied to the Hells Canyon, Alabama-Coosa, and Willamette River cases.

McKeon pushes the appraisal of cost-benefit analysis further, dealing with problems of intangibles, risk, and criteria in relation to time streams of gains or costs. He applies some of his thinking to the Green River (Kentucky and Tennessee) and Santa Maria (California) projects, and then suggests possible uses in other governmental operations. Like the other authors he recognizes that the efficiency criterion is only one of those entering into policy decisions.

The economic analysis of efficiency in resource use should be illuminating to geographers, and the possibility of examining the areal distribution of efficiency criteria as well as income distributions should provoke new geographical studies.

---Gilbert F. White

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